

## Amendments to the Claims

---

1. (Currently Amended) A method for producing a polycyclic aromatic hydrocarbon comprising:
  - a. combusting a carbon-containing material in a flame to condense the carbon-containing material in the flame; and
  - b. collecting from the flame at least a portion of a condensed phase comprising a liquid phase in the flame;  
wherein the liquid phase has not undergone thermolysis and/or dehydrogenation to form mature soot, fullerenes or nanotubes.wherein the condensed phase comprises at least one polycyclic aromatic hydrocarbon.
2. (Previously Presented) The method of Claim 1, wherein the polycyclic aromatic hydrocarbon is a compound having more than 6 carbon atoms bonded to form at least two rings, and at least one carbon-hydrogen bond; and wherein at least one of the rings is an aromatic ring.
3. (Previously Presented) The method of Claim 1, wherein the polycyclic aromatic hydrocarbon comprises a plurality of fused five and six membered rings.
4. (Previously Presented) The method of Claim 1, wherein the polycyclic aromatic hydrocarbon comprises one or more of the polycyclic hydrocarbons identified

by the National Institute of Standards and Technology Special Publication 922. or a partially hydrogenated derivative thereof.

5. (Previously Presented) The method of Claim 1, wherein the polycyclic aromatic hydrocarbon has sufficient hydrogen atoms to have at least one ring with at least one saturated  $-CH_2-$  group.

6. (Previously Presented) The method of Claim 1, wherein the polycyclic aromatic hydrocarbon comprises at least one low molecular weight polycyclic aromatic hydrocarbon, at least one high molecular weight polycyclic aromatic hydrocarbon, or a mixture thereof.

7. (Previously Presented) The method of Claim 6, wherein the low molecular weight polycyclic aromatic hydrocarbon has from about ten to thirty carbon atoms.

8. (Previously Presented) The method of Claim 6, wherein the low molecular weight polycyclic aromatic hydrocarbon has a molecular weight from about 140 to about 400 grams per mole.

9. (Previously Presented) The method of Claim 6, wherein the low molecular weight polycyclic hydrocarbon has from about thirty carbon atoms to about 1000 carbon atoms.

10. (Previously Presented) The method of claim 6, wherein the high molecular weight polycyclic aromatic hydrocarbon is an oil.

11. (Previously Presented) The method of Claim 1, wherein the condensed phase is a liquid phase.

12. (Previously Presented) The method of Claim 11, wherein the condensed phase further comprises a solid phase.

13. (Previously Presented) The method of Claim 1, wherein the condensed phase comprises a plurality of particles.

14. (Previously Presented) The method of Claim 13, wherein at least a portion of the particles have a smallest line at dimension of at least  $5 \times 10^{-8}$  meters.

15. (Previously Presented) The method of Claim 1, wherein the condensed phase additionally comprises soot.

16. (Previously Presented) The method of Claim 1, wherein the collecting step comprises separating the condensed phase from the flame.

17. (Previously Presented) The method of Claim 1, wherein the collecting step further comprises isolating the condensed phase.

18. (Previously Presented) The method of Claim 1, wherein the collecting step comprises quenching the flame with a diluent gas, and separating the condensed phase from the diluent gas.

19. (Previously Presented) The method of Claim 1, wherein the collecting step comprises removing the condensed phase from the flame by suction.

20. (Previously Presented) The method of Claim 1, further comprising the step of extracting the collected condensed phase with an extraction medium.

21. (Previously Presented) The method of Claim 20, wherein the extraction medium comprises an organic solvent.

22. (Previously Presented) The method of Claim 1, wherein the carbon-containing material comprises

a. natural gas, petroleum, wood, coal, charcoal, graphite, or other carbon containing materials derived from plants or animals; or

b. waste, or waste products.

23. (Previously Presented) The method of Claim 1, wherein the carbon-containing materials comprises a hydrocarbon.

24. (Previously Presented) The method of Claim 1, wherein the carbon-containing material comprises an alkane, an alkene, an alkyne, an aromatic compound, or a mixture thereof.

25. (Previously Presented) The method of Claim 1, wherein the carbon-containing material comprises methane, ethane, ethylene, propane, butane, cyclopentane, methylcyclopentane, hexane, cyclohexane, methyl-cyclohexane, dimethyl-cyclohexane, acetylene, propylene, butene, butadiene, cyclopentadiene, dicyclopentadiene, benzene, toluene, xylene, ethylbenzene, styrene, naphthalene, biphenyl, anthracene, phenanthrene, indene, or a mixture thereof.

26. (Previously Presented) The method of Claim 1, wherein the flame employs an oxidant.

27. (Previously Presented) The method of Claim 26, herein the oxidant is air or O<sub>2</sub>.

28. (Previously Presented) The method of Claim 1, further comprising:  
(c) reacting the collected condensed phase to form at least one carbonaceous material.

29. (Cancelled)
30. (Cancelled)
31. (Cancelled)
32. (Cancelled)
33. (Cancelled)
34. (Previously Presented) The method of Claim 28, wherein the reacting occurs in a liquid phase.
35. (Previously Presented) The method of claim 28, wherein the reacting comprises heating.
36. (Previously Presented) The method of Claim 35, wherein the heating occurs at a temperature from about 150°C to about 2500°C.
37. (Previously Presented) The method of Claim 28, wherein the reacting comprises photolysis, dehydrogenating, polymerizing, reducing, or oxidizing.

38. (Previously Presented) The method of Claim 28, wherein the reacting produces H<sub>2</sub>.

39. (Previously Presented) The method of Claim 28, wherein the reacting occurs in the presence of at least one agent.

40. (Previously Presented) The method of Claim 39, wherein the agent is a C<sub>1</sub>-C<sub>25</sub> hydrocarbon, a polycyclic aromatic hydrocarbon, an oxidizing agent, a reducing agent, a free-radical inducing agent, a catalyst, or a mixture thereof.

41. (Previously Presented) The method of Claim 39, wherein the agent is a catalyst.

42. (Previously Presented) The method of Claim 41, wherein the catalyst is a metal or metal compound.

43. (Cancelled)

44. (Previously Presented) The product produced by the process of Claim 1.

45. (Cancelled)

46. (Currently Amended) A method for producing a polycyclic aromatic hydrocarbon, the method comprising:

- a. combusting at least one carbon-containing material in a flame to condense the carbon-containing material in the flame; and
- b. collecting from the flame at least a portion of a condensed phase comprising a liquid phase in the flame;

wherein the liquid phase has not undergone thermolysis and/or dehydrogenation to form mature soot, fullerenes or nanotubes,

wherein the condensed phase comprises pyrene.

47. (Previously Presented) The method of Claim 46, wherein the collecting step comprises removing the condensed phase from the flame by suction.

48. (Previously Presented) The method of Claim 46 wherein the carbon-containing material is a hydrocarbon.

49. (Currently Amended) A method for producing a polycyclic aromatic hydrocarbon, the method comprising:

- a. combusting a carbon-containing material in a flame to condense the carbon-containing material in the flame; and
- b. collecting from the flame at least a portion of a condensed phase comprising a liquid phase in the flame;



wherein the liquid phase has not undergone thermolysis and/or dehydrogenation to form mature soot, fullerenes or nanotubes,

wherein the condensed phase comprises at least one polycyclic aromatic hydrocarbon having from ten to thirty carbon atoms.

50. (Previously Presented) The method of claim 49 wherein the collecting step comprises removing the condensed phase from the flame by suction.

51. (Previously Presented) The method of claim 49 wherein the carbon-containing material is a hydrocarbon.

52. (Previously Presented) The method of claim 49 further comprising:  
(c) reacting the collected condensed phase to form at least one carbonaceous material.

---